

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of the claims in the application:

LISTING OF CLAIMS

1. (Currently Amended) An isolated [[A]] *Marchantiales*-derived gene that hybridizes under stringent conditions with all of or part of a ~~DNA nucleotide sequence, or its complementary sequence, of SEQ ID NO: 1~~ or a complementary sequence thereof, and wherein said gene encodes a protein having [[a]] $\Delta 6$ fatty acid desaturating activity.
2. (Currently Amended) [[A]] The isolated gene of claim 1, wherein said gene ~~that encodes a *Marchantiales*-derived protein having a $\Delta 6$ fatty acid desaturating activity, and that (a) consists of a nucleotide sequence of SEQ ID NO: 1, or (b) hybridizes under stringent conditions with~~ to SEQ ID NO: 1 a DNA nucleotide sequence, or its or a complementary sequence thereto, of SEQ ID NO: 1.
3. (Currently Amended) [[A]] The isolated gene of claim 1, wherein said gene ~~that encodes a *Marchantiales*-derived protein having a $\Delta 6$ fatty acid desaturating activity, and that (a) comprises~~ consists of a nucleotide sequence of nucleotides 253 to 1698 from the 253rd to 1698th nucleotides of SEQ ID NO: 1, or (b) hybridizes under stringent conditions to ~~with a DNA nucleotide sequence comprising nucleotides 253 to 1698 of SEQ ID NO: 1, of from the 253rd to 1698th nucleotides, or its or a complementary nucleotide sequence thereto, of SEQ ID NO: 1.~~
4. (Currently Amended) An isolated [[A]] gene encoding ~~that encodes a~~ *Marchantiales*-derived protein having [[a]] $\Delta 6$ fatty acid desaturating activity, ~~and that (a) encodes a protein with~~ wherein said protein has an amino acid sequence of SEQ ID NO: 2, or wherein said gene ~~(b)~~ encodes a protein with an amino acid sequence that has been modified

by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 2.

5. (Currently Amended) An isolated ~~[[A]]~~ *Marchantiales*-derived gene that hybridizes under stringent conditions ~~to with~~ all of or part of a ~~DNA nucleotide sequence, or its complementary sequence,~~ of SEQ ID NO: 3~~[[,]]~~ or a complementary sequence thereof, and wherein said gene ~~and~~ encodes a protein having ~~[[a]]~~ $\Delta 6$ chain elongating activity.

6. (Currently Amended) ~~[[A]]~~ The isolated gene of claim 5, wherein said gene that encodes a *Marchantiales*-derived protein having a $\Delta 6$ chain elongating activity, and that (a) consists of a nucleotide sequence of SEQ ID NO: 3, or (b) hybridizes under stringent conditions ~~to with~~ SEQ ID NO:3 or a complementary sequence thereto ~~a DNA nucleotide sequence, or its complementary sequence, of SEQ ID NO: 3.~~

7. (Currently Amended) ~~[[A]]~~ The isolated gene of claim 5, wherein said gene that encodes a *Marchantiales*-derived protein having a $\Delta 6$ chain elongating activity, and that (a) ~~consists of~~ comprises a nucleotide sequence of nucleotides 194 to 1066 ~~from the 194th to 1066th nucleotides~~ of SEQ ID NO: ~~[[1]]~~ 3, or (b) hybridizes under stringent conditions ~~to with~~ a ~~DNA~~ nucleotide sequence of nucleotides 194 to 1066 of SEQ ID NO: 1 or a complementary nucleotide sequence thereto ~~from the 194th to 1066th nucleotides, or its complementary sequence, of SEQ ID NO: 1.~~

8. (Currently Amended) An isolated ~~[[A]]~~ gene encoding that encodes a *Marchantiales*-derived protein having ~~[[a]]~~ $\Delta 6$ chain elongating activity, wherein said protein has and that (a) encodes a protein with an amino acid sequence of SEQ ID NO: 4, or (b) wherein said gene encodes a protein with an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 4.

9. (Currently Amended) An isolated [[A]] *Marchantiales*-derived gene that hybridizes under stringent conditions to ~~with~~ all of or part of a ~~DNA-nucleotide-sequence, or its complementary sequence, of SEQ ID NO: 5 or a complementary sequence thereto,~~ wherein said gene, and encodes a protein having [[a]] $\Delta 5$ fatty acid desaturating activity.

10. (Currently Amended) The isolated [[A]] gene of claim 9, wherein said gene that encodes a *Marchantiales*-derived protein having a $\Delta 5$ fatty acid desaturating activity, and that (a) consists of a nucleotide sequence of SEQ ID NO: 5, or (b) hybridizes under stringent conditions to ~~with a DNA-nucleotide-sequence, or its complementary sequence, of SEQ ID NO: 5 or a complementary sequence thereto.~~

11. (Currently Amended) [[A]] The isolated gene of claim 9, wherein said gene that encodes a *Marchantiales*-derived protein having a $\Delta 5$ fatty acid desaturating activity, and that (a) ~~comprises~~ consists of a nucleotide sequence of ~~from the 375th to 1829th nucleotides 375 to 1829~~ of SEQ ID NO: 5, or (b) hybridizes under stringent conditions ~~with to~~ a DNA nucleotide sequence of ~~from the 375th to 1829th nucleotides 375 to 1829, or its complementary sequence, of SEQ ID NO: 5 or a complementary nucleotide sequence thereto.~~

12. (Currently Amended) An isolated [[A]] gene encoding that encodes a *Marchantiales*-derived protein having [[a]] $\Delta 5$ fatty acid desaturating activity, wherein said protein has and that (a) encodes a protein with an amino acid sequence of SEQ ID NO: 6, or (b) wherein said gene encodes a protein with an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 6.

13. (Currently Amended) A protein encoded by a gene of ~~any one of claims claim~~ 1 through 12.

14. (Currently Amended) An isolated [[A]] protein (a) comprising ~~consisting of~~ ~~an amino acid sequence of SEQ ID NO: 2~~, or (b) consisting of an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 2, and wherein said protein has ~~having a~~ $\Delta 6$ fatty acid desaturating activity.

15. (Currently Amended) An isolated [[A]] protein (a) comprising ~~consisting of~~ ~~an amino acid sequence of SEQ ID NO: 4~~, or (b) consisting of an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 4, and wherein said protein has ~~having a~~ $\Delta 6$ chain elongating activity.

16. (Currently Amended) An isolated [[A]] protein (a) comprising ~~consisting of~~ ~~an amino acid sequence of SEQ ID NO: 6~~, or (b) consisting of an amino acid sequence that has been modified by substitution, deletion, insertion, and/or addition of one or more amino acids of SEQ ID NO: 6, and wherein said protein has ~~having a~~ $\Delta 5$ fatty acid desaturating activity.

17. (Currently Amended) An isolated antibody which recognizes a protein of ~~any one of claims claim 13 through 16~~.

18. (Currently Amended) A recombinant expression vector which comprises a gene of ~~any one of claims claim 1 through 12~~.

19. (Currently Amended) A transformant ~~into which~~ comprising a gene of ~~any one of claims claim 1 through 12 is introduced~~.

20. (Currently Amended) A plant into which ~~at least a gene of any one of claims claim 1 through 12 is expressed~~ expressibly introduced, a progeny of the plant, a vegetatively

propagated plant ~~its offspring or vegetatively propagated plants~~ having the same characteristics, or a tissue of the plant.

21. (Currently Amended) A plant of claim 20, wherein said plant has a modified ~~into which at least a gene of any one of claims 1 through 12 is expressibly introduced and whose fatty acid composition is thereby modified, its offspring~~ a progeny of the plant, or a vegetatively propagated plant ~~plants~~ having the same characteristics, or a tissue of the plant.

22. (Currently Amended) A reproductive material of a plant of claim 20 ~~or 21~~.

23. (Currently Amended) A method of producing fatty acids comprising growing ~~a plant of claim 20 and obtaining said fatty acids from said plant or plant tissue, using a plant or a plant tissue of claim 21.~~

24. (Currently Amended) A composition comprising material substance which ~~includes~~ at least one compound selected from the group consisting of: γ -linolenic acid; dihomogamma-linolenic acid; arachidonic acid; stearidonic acid; eicosatetraenoic acid; and eicosapentaenoic acids, ~~which are~~ wherein said compound is obtained by a method of claim 23.

25. (Currently Amended) A method of modifying a fatty acid composition comprising expressing a gene of claim 1, using at least a gene of any one of claims 1 through ~~12.~~

26. (Currently Amended) A gene detecting instrument comprising as a probe at least a portion of a nucleotide sequence, or its complementary sequence, of a gene of ~~any one of claims~~ claim 1 ~~through 12~~.

27. (Currently Amended) A screening method of a gene or substance that regulates a protein of SEQ ID NO:2 ~~any one of claims 13 through 16~~, using a protein of ~~any one of claims~~ claim ~~13 through 16~~.

28. (Original) A gene or substance obtained by a screening method of claim 27.